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Clinical equilibration tests, proprioceptive system and Adolescent Idiopathic Scoliosis (AIS)

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Objective The AIS is a three-dimensional deformation of the spine, frequent, potentially progressive, with unknown etiology. It is generally accepted as being multifactorial origin, including neurosensorial factors, with orthostatic postural control disorders. In particular, Assaiante et al. showed a selective impaired of the dynamic proprioceptive tract. However, the procedures used to establish this impaired are complex and require motion analysis laboratories, inaccessible in routine clinical practice. Our objective is to determine whether, by clinical equilibration tests, simple, realizable in routine care, it is possible to find the same result.
Methods A cross-sectional study comparing 114 adolescents with right thoracic AIS (including 94 girls, mean age: 14.5 ± 1.9 years, Cobb angle: 35.7 ± 15.3°) with 81 matched non-scoliotic adolescents (including 69 girls, mean age: 14.1 ± 1.9 years) was conducted between January 2013 and March 2015. Three clinical equilibration tests are performed: a dynamic test (Fukuda stepping test-Utenberger), two static tests (Romberg sensitized Support monopodal eyes closed).
Results For the static tests, no significant difference between the 2 groups. The difference is significant for the dynamic test, for the distance travelled ($P < 0.01$) and the deviation angle ($P < 0.0001$).
Discussion Our study confirms Assaiante's results, suggesting a specific impairment of dynamic proprioceptive tract in AIS. This clinical equilibration tests can be performed in daily practice. It is necessary to assess their validity as a biomarker for screening and progression of the AIS.
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Keywords Adolescent idiopathic scoliosis; Pathophysiology; Proprioception; Postural control
Disclosure of interest The authors have not supplied their declaration of conflict of interest.
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Maintaining trunk and head upright optimizes visual vertical measurement after stroke

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Objectives Visual vertical (VV) measurement provides information about spatial cognition and is now part of postural disorders assessment [1,2]. Guidelines for clinical VV measurement after stroke remain to be established, especially regarding the orientation settings for patients who do not sit upright. We analyzed the need to control body orientation while patients estimate the VV.
Methods VV orientation and variability were assessed in 20 controls and 36 subacute patients undergoing rehabilitation after a first hemisphere stroke, in 3 setting: body not maintained (trunk and head free), partially maintained (trunk maintained, head free), or maintained (trunk and head). VV was analyzed as a function of trunk and head tilt, also quantified.
Results Trunk and head orientations were independent. The ability to sit independently was affected by a tilted trunk. The setting had a strong effect on VV orientation and variability in patients with contralesional trunk tilt ($n = 11$; trunk orientation –18.4 ± 11.7°). The contralesional VV bias was severe and consistent under partially maintained (–8.4 ± 5.2°) and maintained (–7.8 ± 3.5°) settings, whereas various individual behaviors reduced the mean bias under the non-maintained setting (–3.6 ± 9.3°, $P < 0.05$). VV variability was lower under the maintained (1.5 ± 0.2°) than non- (3.7 ± 0.4°, $P < 0.001$) and partially (3.6 ± 0.2°, $P < 0.001$) maintained settings. In contrast, setting had no effect in patients with satisfactory postural control in sitting.
Conclusion Subject setting improves VV measurement in stroke patients with postural disorders. Maintaining the trunk upright enhances the validity of VV orientation, and maintaining the head upright enhances the validity of within-subject variability. Measuring VV without any body maintaining is valid in patients with satisfactory balance abilities.
Keywords Verticality perception; Postural disorders; Stroke; Lateropulsion
Disclosure of interest The authors have not supplied their declaration of conflict of interest.
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